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10/562,237	03/29/2006	Wolfgang Kemper	DE03 0231 US1	3782
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EXAMINER				
THOMAS, LUCY M				
ART UNIT		PAPER NUMBER		
2836				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

# Office Action Summary

**Application No.**

10/562,237

**Applicant(s)**

KEMPER, WOLFGANG

**Examiner**

Lucy Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 12 is objected to because of the following informalities: Recitation of "a clamping device" in line 7 should be corrected to "the clamping device." Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krakauer et al. (US 5,617,283) in view of Avery et al. (US 6,501,632). Regarding Claim 1, Krakauer discloses an integrated protection circuit for an integrated circuit device (Figures 1-2), comprising: a first transistor 45a (Figure 2) whose control outputs are connected between a pad 12 and a control input of a clamping device 18, control outputs of said clamping device being connected between said pad and a reference voltage terminal VSS, a second transistor 45b whose control input of the clamping device and said reference voltage terminal, and time-delay means 42,46 connected to a supply voltage terminal 16 and said control inputs of said first transistor and said second transistor. Krakauer differs as to the connection of the time delay means to the control inputs (output between the time delay elements are connected to the control input, not at one end of the means to have the delay means between the control inputs and the

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power supply terminal). Avery discloses a time delay means RZ1, C (see Figure 3) connected between a pad 301 and control input of an NMOS transistor to control the on/off of the transistor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the circuit of Krakauer, and to have the delay means connected as taught by Avery, to provide the delay dependent on the changes on one of the power supply to provide charging voltage to control the gate of the transistor, and the element/s (element Z2 in Figure 3 of Avery) connected between the gate and the other power supply to provide a current path to limit the voltage for the gate control (see Avery, Column 3, lines 42-64).

Regarding Claim 2, Krakauer discloses that the pad is a signal pad or a power supply pad.

Regarding Claim 3, Avery discloses that the time- delay element comprises a series connection of a resistor and a capacitance (see series connection of resistor Rz1 and capacitor C in Figure 3).

Regarding Claim 4, Krakauer discloses that the time delay means comprises a third transistor, the resistor being connected between the supply voltage terminal and said third transistor 46a, said third transistor forming the capacitance.

Regarding Claim 5, Krakauer discloses that a fourth transistor 46b provided whose control outputs are connected between the reference voltage terminal and the control output of the third transistor. Krakauer does not disclose that that control input is connected to said reference voltage terminal (Krakauer has a diode connected MOS

transistor whereas the claim recites a grounded gate MOS transistor). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a grounded gate MOS transistor, in place of a diode connected MOS transistor, because both connections remain off during normal operation of IC, and are used to clamp voltages during an ESD event, and differs only where the gate is connected to operate as a clamp, and the selection is based on the design requirements.

Regarding Claim 6-8, Krakauer discloses that the first transistor (MP1) is a p-channel MOS transistor (45a is a PMOS transistor), the second, third and fourth transistor are n-channel MOS transistors, and the clamping device is an n-channel MOS transistor laid out for ESD protection (see Figure 2).

Regarding Claim 9, Avery discloses a clamping device Q1' which is a parasitic npn transistor.

Regarding Claim 12, Krakauer discloses an integrated protection circuit for protecting an integrated circuit device, the protection circuit comprising: a clamping device 18 having a control input and two control outputs, the control outputs including a first control output coupled to a pad 12 and a second control output coupled to a reference voltage terminal  $V_{SS}$ ; a first transistor 45a having control outputs connected between the pad and the control input of the clamping device; a second transistor 45b having control outputs connected between the reference voltage terminal and the control input of the clamping device; and a time-delay circuit 42,46 including a resistor and a capacitive device (diode connected transistors 42, 46 provide resistor and capacitive elements) connected in series, and to a power supply 16 and the control

inputs of the first and second transistors, the resistor being connected to the power supply and the capacitive device being connected to the control inputs of the first and second transistors.

Krakauer differs as to the connection of the time delay means to the control inputs (output between the time delay elements are connected to the control input, not at one end of the means to have the delay means between the control inputs and the power supply terminal). Avery discloses a time delay means RZ1, C (see Figure 3) connected between a pad 301 and control input of an NMOS transistor to control the on/off of the transistor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the circuit of Krakauer, and to have the delay means connected as taught by Avery, to provide the delay dependent on the changes on one of the power supply to provide charging voltage to control the gate of the transistor, and the element/s (element Z2 in Figure 3 of Avery) connected between the gate and the other power supply to provide a current path to limit the voltage for the gate control (see Avery, Column 3, lines 42-64).

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krakauer et al. (US 5,617,283) in view of Avery et al. (US 6,501,632) and Ker et al. (US 2002/0050615). Regarding Claim 10, Krakauer and Avery do not disclose a thyristor device. Ker discloses an ESD protection circuit (see Figure 7b) comprising a clamping device which is a thyristor (see nSCR device). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of

Krakauer and Avery, and to use a thyristor in place of the MOS transistor, because Ker teaches the use of thyristor as ESD clamping device for the protection of integrated circuits from ESD and EOS.

5. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krakauer et al. (US 5,617,283) in view of Avery et al. (US 6,501,632) and Lai et al. (US 2003/0235022). Regarding Claims 11 and 15, Krakauer and Avery do not disclose a diode between the pad and the supply voltage terminal. Lai discloses an ESD protection circuit comprising a diode 52 connected between a pad 40 and a power supply voltage terminal 50 (see Figure 4A). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Krakauer and Avery, and to provide a diode as taught by Lai to provide an ESD path from PAD to the power supply pad to protect the IC and to isolate the pads during normal operation.

6. Claims 1-3, 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over John et al. (US 6,522,511) in view of Avery et al. (US 6,501,632). Regarding Claim 1, John discloses an integrated protection circuit for an integrated circuit device (Figures 1-3), comprising: a first transistor (PMOS of 32 in Figure 3) whose control outputs are connected between a pad 22 and a control input of a clamping device 34, control outputs of said clamping device being connected between said pad and a reference voltage terminal 20, a second transistor (NMOS of 32) whose control input of the clamping device and said reference voltage terminal, and time-delay means 30 connected to a supply voltage terminal 18 and said control inputs of said first transistor

and said second transistor. John differs as to the connection of the time delay means to the control inputs (output between the time delay elements are connected to the control input, not at one end of the means to have the delay means between the control inputs and the power supply terminal). Avery discloses a time delay means RZ1, C (see Figure 3) connected between a pad 301 and control input of an NMOS transistor to control the on/off of the transistor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the circuit of John, and to have the delay means connected as taught by Avery, to provide the delay dependent on the changes on one of the power supply to provide charging voltage to control the gate of the transistor, and the element/s (element Z2 in Figure 3 of Avery) connected between the gate and the other power supply to provide a current path to limit the voltage for the gate control (see Avery, Column 3, lines 42-64).

Regarding Claim 2, John discloses that the pad 22 is a signal pad or a power supply pad. Regarding Claim 3, Avery discloses that the time- delay element comprises a series connection of a resistor and a capacitance (see series connection of resistor Rz1 and capacitor C in Figure 3).

Regarding Claim 11, John discloses a diode 44 between the pad and the supply voltage terminal.

Regarding Claim 12, John discloses an integrated protection circuit for protecting an integrated circuit device (Figures 1-3), the protection circuit comprising: a clamping device 34 having a control input and two control outputs , the control outputs including a

first control output coupled to a pad 22 and a second control output coupled to a reference voltage terminal 20; a first transistor (PMOS transistor of inverter 32) having control outputs connected between the pad and the control input of the clamping device; a second transistor (NMOS transistor of 32) having control outputs connected between the reference voltage terminal and the control input of the clamping device; and a time-delay circuit 30 including a resistor and a capacitive device (resistor and transistor capacitive element in Figure 3) connected in series and to a power supply 18 and the control inputs of the first and second transistors, the resistor being connected to the power supply and the capacitive device being connected to the control inputs of the first and second transistors. John differs as to the connection of the time delay means to the control inputs (output between the time delay elements are connected to the control input, not at one end of the means to have the delay means between the control inputs and the power supply terminal).

Avery discloses a time delay means RZ1, C (see Figure 3) connected between a pad 301 and control input of an NMOS transistor to control the on/off of the transistor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the circuit of John, and to have the delay means connected as taught by Avery, to provide the delay dependent on the changes on one of the power supply to provide charging voltage to control the gate of the transistor, and the element/s (element Z2 in Figure 3 of Avery) connected between the gate and the other power supply to provide a current path to limit the voltage for the gate control (see Avery, Column 3, lines 42-64).

Regarding Claim 13-15, John discloses that the capacitive device is not directly coupled to the pad, the resistor is directly connected to the capacitive device with no intervening circuits, and a diode 44 coupled directly between the power supply and the output terminal with no intervening circuits, the diode adapted to mitigate current flow from the power supply to the output terminal (44 is reverse biased from 18 to 22).

### ***Response to Arguments***

7. Applicant's arguments filed on 3/19/2008 have been fully considered but they are rendered moot in view of new grounds of rejection.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yu et al. (US 4,802,054), Tyler et al. (US 2003/0202300).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy Thomas whose telephone number is 571-272-6002. The examiner can normally be reached on Monday - Friday 8:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Michael J Sherry/  
Supervisory Patent Examiner, Art Unit 2836

/L. T./  
Examiner, Art Unit 2836  
June 26, 2008